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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/612,649	07/02/2003	Joo Sun Yoon	21C-0058	5474

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EXAMINER	
DUONG, THOI V	
ART UNIT	PAPER NUMBER
2871	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/612,649	YOON ET AL.	
	Examiner	Art Unit	
	Thoi V. Duong	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *03* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) *8-13 and 19-23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 14-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/02/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 16, 2006 has been entered.

Accordingly, claims 1 and 14 were amended, claim 24 was cancelled, and claims 8-13 and 19-23 were withdrawn. Currently, claims 1-23 are pending in this application; of these claims, claims 1-7 and 14-18 are considered in this office action.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3, 5, 7, 14, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Prior Art (Figs. 1-4) in view of Kubota et al. (Kubota, USPN 6,771,334 B2).

Re claim 1, as shown in Figs. 1-4, Applicant's Prior Art discloses a reflective-transmissive type liquid crystal display device, comprising:

a first substrate 11, including:

a thin film transistor 12 disposed on a first transparent substrate 11,

an organic insulation layer 13 disposed on the first transparent substrate 11 to insulate the thin film transistor 12, the organic insulation layer 13 having a contact hole 13a for exposing an output terminal of the thin film transistor (page 3, lines 13-16),

a pixel electrode 14 having a transparent electrode 14a connected to the output terminal 12d of the thin film transistor 12 through the contact hole 13a disposed on the organic insulation layer 13 (page 3, lines 17-24), and a reflective electrode 14b disposed on a first region of the transparent electrode 14a (reflective display region), a second region 14c of the transparent electrode 14a being exposed without being covered by the reflective electrode 14b (transmissive display region) (page 4, lines 4-10), the second region 14c including a first boundary, wherein the first boundary is a boundary between the first and second regions 14b and 14c as shown in Figs. 2-4, and

an orientation film 15 coated on an upper surface of the pixel electrode 14 and having an orientation groove rubbed in a first direction 15a toward the second region 14c (page 4, lines 13-22);

a second substrate 21, including:

a color filter 22 disposed on a second transparent substrate 21 in opposition to the pixel electrode 14, and

a common electrode 23 disposed on an upper surface of the color filter and facing the pixel electrode 14, and

a liquid crystal 30 interposed between the first and second substrates.

Re claim 14, as shown in Fig. 1, Applicant's Prior Art discloses a method for fabricating a reflective-transmissive type liquid crystal display device, the method comprising:

forming a thin film transistor 12 on a first transparent substrate 11,

depositing an organic insulation layer 13 on the first transparent substrate 11 to insulate the thin film transistor 12, the organic insulation layer 13 having a contact hole 13a for exposing an output terminal 12d of the thin film transistor 12 (page 3, lines 13-16),

forming a pixel electrode 14 on the organic insulation layer 13, the pixel electrode 14 having a transparent electrode 14a connected to the output terminal 12d of the thin film transistor 12 through the contact hole 13a (page 3, lines 17-24) and a reflective electrode 14b formed on a first region of the transparent electrode 14 (reflective display region), a second region 14c of the transparent electrode 14 being exposed without covering by the reflective electrode 14b (transmissive display region) (page 4, lines 4-10), the second region 14c including a first boundary, wherein the first boundary is a boundary between the first and second regions 14b and 14c as shown in Figs. 2-4;

coating an orientation film 15 on an upper surface of the pixel electrode 14;

rubbing the orientation film 15 in a first direction 15a toward the second region 14c to form an orientation groove on the orientation film (page 4, lines 13-22).

forming a color filter 22 on a second transparent substrate 21 in opposition to the pixel electrode 14,

forming a common electrode 23 on an upper surface of the color filter 22, the common electrode 23 facing the pixel electrode 14, and

interposing a liquid crystal 30 between the common electrode 23 and the pixel electrode 14 on which the orientation film 15 and the orientation groove are formed.

However, Applicant's Prior Art does not show the second region including a second boundary where the second boundary is an exposed edge of the second region.

As shown in Figs. 4 and 5a, Kubota discloses a reflective-transmissive type liquid crystal display device comprising a pixel electrode 3 including an electrode for a reflective display 3a (reflective electrode) disposed on a first region (reflective display region) facing a color filter 9 of red (R), green (G) and blue (B) disposed on a counter substrate 5; and an electrode for a transmissive display 3b (transmissive electrode) disposed in a second region (transmissive display region) facing a non-color layer 10 disposed on the counter substrate 10 without being covered by the reflective electrode (col. 8, lines 14-21 and col. 12, lines 25-32); and an alignment layer 7(7a, 7b) coated on an upper surface of the pixel electrode 3.

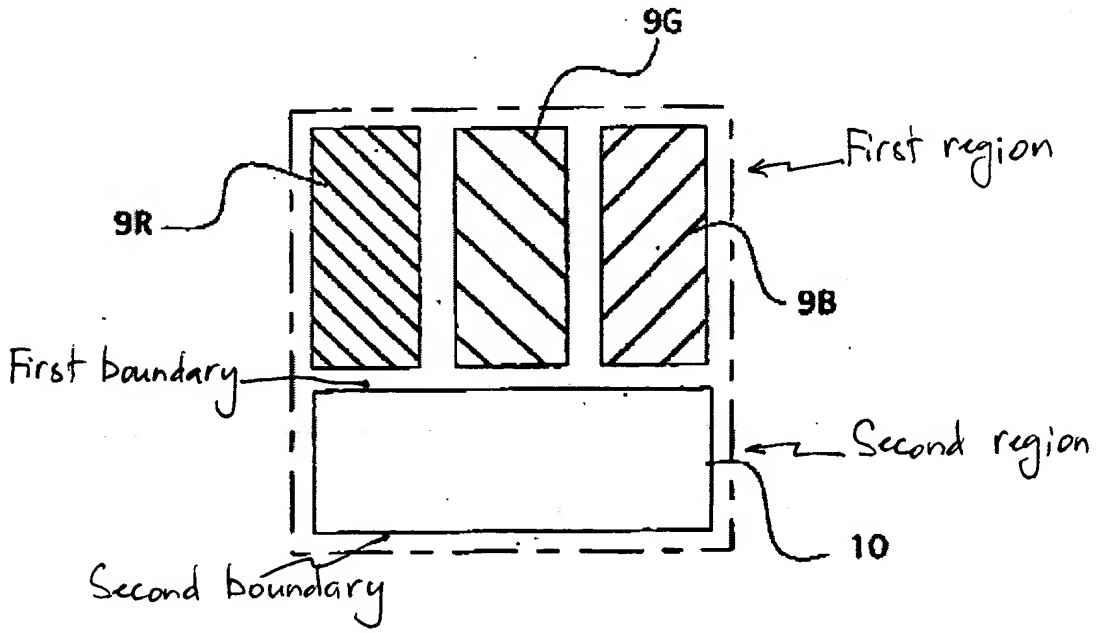
Accordingly, as shown in Fig. 5a (annotated), the second region facing the non-color layer 10 includes a first boundary and a second boundary, where the first boundary is a boundary between the first and second regions and the second boundary is an exposed edge of the second region.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Applicant's Prior Art with the teaching of Kubota by forming a pixel electrode having a reflective electrode formed in the first region and a

transparent electrode formed in the second region, the second region including a first boundary and a second boundary where the first boundary is a boundary between the first and second regions and the second boundary is an exposed edge of the second region in order to obtain a device capable of precisely controlling the alignment of liquid crystal molecules, and of providing a display with high brightness and high color purity both in a transmissive display mode and in a reflective display mode (col. 3, lines 13-18).

Since Applicant's Prior Art in view of Kubota has the same structure with the instant invention, claimed properties or functions recited in claims 1 and 14 are presumed to be inherent (see MPEP 2112.01); therefore, it is obvious that the orientation groove rubbed in a first direction toward the second region including the first boundary and the second boundary also prevents impurity from being stacked at the first boundary of the transparent electrode.

FIG. 5a



Re claim 2, as shown in Fig. 4 of Applicant's Prior Art, the first boundary of the transmissive display region 14a and the reflective display region 14b includes at least two vertical straight lines in a layout of the pixel electrode 14,

wherein, re claim 3, the first direction 15a is parallel to two vertical straight lines of the first boundary of the transmissive display region 14a and the reflective display region 14b.

Re claim 5, as shown in Figs. 2-4 of Applicant's Prior Art, the second region 14c exposes two edges of the first region 14b of the transparent electrode 14a, and the two edges, one of the vertical edges and one of the horizontal edges of the first boundary of the second region 14c, are connected to each other,

wherein, re claim 7, the first boundary and the first region each an L-shaped configuration.

Re claim 15, forming a pixel electrode 14 in the method for fabricating a reflective-transmissive type liquid crystal display device of Applicant's Prior Art comprises (page 3, line 17 through page 4, line 10):

forming the transparent electrode 14a on the first transparent substrate 11 on which the thin film transistor 12 and the organic insulation layer 13 are formed;

forming a metal thin film on an upper surface of the transparent electrode; and

patterning the metal thin film such that the reflective electrode 14b is formed on the first region of the transparent electrode 14a and the first boundary between the first

and second regions (boundary of the opening 14c) has a linear shape (squared shape) in a layout of the pixel electrode (Figs. 2-4).

Re claim 17, forming a pixel electrode 14 in the method for fabricating a reflective-transmissive type liquid crystal display device of Applicant's Prior Art comprises (page 3, line 17 through page 4, line 10):

forming the transparent electrode 14a on the first transparent substrate 11 on which the thin film transistor 12 and the organic insulation layer are formed,

forming a metal thin film on an upper surface of the transparent electrode 14a, and

patterning the metal thin film such that the reflective electrode 14b is formed on the first region of the transparent electrode and the second region exposes two edges of the transparent electrode 14a, the two edges, one of the vertical edges and one of the horizontal edges of the boundary of the second region 14c, being connected to each other (Figs. 2-4).

4. Claims 4, 6, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Prior Art in view of Kubota et al. (Kubota, USPN 6,771,334 B2) as applied to claims 1-3, 5, 7, 14, 15 and 17 above, and further in view of Kubo et al. (Kubo, USPN 6,452,654 B2).

Applicant's Prior Art in view of Kubota discloses a reflective-transmissive type liquid crystal display device as well as a method for fabricating the same that is basically the same as that recited in claims 4, 6, 16 and 18 except for forming the sidewall inclined (slanting) to prevent the impurity from being stacked at the boundary.

As shown in Figs. 8A and 8B, Kubo discloses a reflective-transmissive type liquid crystal display device comprising a pixel electrode having a transparent electrode 51 and a reflective electrode 50 disposed on a first region of the transparent electrode 51 (both sides of the transparent electrode 51) and a second region of the transparent electrode 51 (middle portion of the transparent electrode 51) being exposed without being covered by the reflective electrode 50,

wherein the reflective electrode 50 includes a sidewall making contact with the (first) boundary of the first and second regions, and the sidewall is inclined as shown in Figs. 8A and 8B.

Since the structure of the reflective electrode of Kubo is the same as that of the invention, claimed properties or functions are presumed to be inherent (see MPEP 2112.01); therefore, it is obvious that the inclined sidewall also prevents the impurity from being stacked at the boundary of the first and second regions.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the Applicant's Prior Art with the teaching of Kubo by forming an inclined sidewall of the reflective electrode at the first region adjacent to the first boundary for not only preventing the impurity from being stacked at the sidewall of the reflective electrode but also improving the aperture ratio of the pixel (col. 14, lines 48-55).

Response to Arguments

5. Applicant's arguments filed October 16, 2006 have been fully considered but they are not persuasive.

Applicant argued that Applicant's Prior Art (APA) and Kubota do not disclose the second boundary being an exposed edge of the second region and an orientation groove rubbed in a first direction from the first boundary toward the second boundary.

The Examiner disagrees with Applicant's remarks. As shown in Figs. 1-4, APA suggests a reflective-transmissive type LCD device comprising an orientation film coated on an upper surface of the pixel electrode 14 and having an orientation groove rubbed in a first direction 15a toward the second region as a transmissive display region. Meanwhile, as shown in Figs. 4 and 5a, Kubota discloses a reflective-transmissive type LCD device comprising a structure having a first region as a reflective display region facing color filters 9R, 9G and 9B disposed on a counter substrate 5, and a second region as a transmissive display region facing a non-color layer 10 disposed on the counter substrate 5, wherein the second region includes a first boundary and a second boundary, where the first boundary is a boundary between the first and second regions and the second boundary is an exposed edge of the second region.

Accordingly, it is obvious that the structure of Kubota where the second region includes the second boundary can be applied to the reflective-transmissive type LCD device of APA in order to provide a display with excellent quality due to controlling the alignment of liquid crystal molecules. It is also obvious that, with the modification, the orientation film has an orientation groove rubbed in a first direction toward the second region boundary since the second boundary is included in the second region.

Thus, the requirements of prima facie obviousness are met since APA in view of Kubota produces the claimed invention.

Finally, Kubo is employed for teaching an inclined side wall of the reflective electrode for not only preventing the impurity from being stacked at the sidewall of the reflective electrode but also improving the aperture ratio of the pixel.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thoi V. Duong whose telephone number is (571) 272-2292. The examiner can normally be reached on Monday-Friday from 8:30 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms, can be reached at (571) 272-1787.

Thoi V. Duong

01/02/2007